NEW SYNTHESIS OF ARYLCYCLOPROPANES

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L. I. Zakharkin and A. A. Savina

Institute of Heteroorganic Compounds, Academy of Sciences of the USSR
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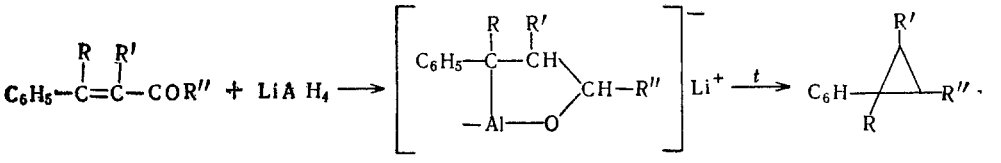
It is known that the reduction of cinnamaldehyde [1], and also of the other aryl α, β- unsaturated aldehydes, ketones, alcohols and esters with lithium aluminum hydride in ether solution at room temperature gives lithium aluminates A as the intermediate products. We found that arylcyclopropane hydrocarbons are formed in 50-70% yield when A is heated at 170-240°, for example



Thus, a mixture of 0.09 mole of cinnamaldehyde and 0.1 mole of $LiAlH_4$ in 100 ml of ether was heated at 35° for 3-4 h. The residue from distilling off the ether was heated in a vacuum of 8-10 mm up to 200°. The obtained phenylcyclopropane (0.055 mole, 60%) was distilled off, b. p. 172-173°; n_D^{23} 1.5310; d_4^{20} 0.9385. In a similar manner were obtained: 1-methyl-2-phenylcyclopropane from benzalacetone, 1-ethyl-2-phenylcyclopropane from ethylstyrylcarbinol, 1-methyl-1-phenylcyclopropane from ethyl β-methylcinnamate, 1-tert-butyl-2-phenylcyclopropane from benzalpinacolin, 1,2-diphenylcyclopropane from benzalacetophenone, 1-ethyl-2,3-diphenylcyclopropane from α-ethylchalcone, 1-methyl-1,2-diphenylcyclopropane from dypnone, 1,2,3,-triphenylcyclopropane from benzaldesoxybenzoin, and 1-phenyl-2-anisylcyclopropane from anisalacetophenone. The structure of the obtained cyclopropane hydrocarbons was confirmed by chromatographic analysis and the infrared and NMR spectra. The presence of olefins as impurities was detected in a number of cases.

LITERATURE CITED

1. F. A. Hochstein and W. G. Brown, J. Am. Chem. Soc. 70, 3484 (1948).